THE RARS -EXCITER-

RALEIGH AMATEUR RADIO SOCIETY
WORLDWIDE FRIENDSHIP

CLUB CALL: W4DW
REPEATER: W4DW/R 146.04/64

AUGUST, 1986
ISSUE 197

LEADING EDGE

SHERMAN STARNES
W4TZU

****

AMSAT engineers and command stations around the world have been involved in intensive efforts to return OSCAR 10 to some useable condition since it developed serious problems in mid-May. Initially, it was thought that OSCAR 10 might not recover from what appeared to be a massive radiation-induced memory problem. After some investigation and tests, it appeared that the satellite might be returned to some level of service in a few months. Now, in surprisisng developments, the memory has been mapped and the affected areas identified, software has been loaded to resume spacecraft orientaion operations and the mode B transponder has been made available from mean anomaly 75 to 110, a period of about one hour, thirty eight minutes per orbit. At the present time (late July) that portion of the orbit does not occur within view of our area. Recovery efforts continue and the period for operation is expected to be extended. There is still some consideration being given the idea of draining the batteries in some graceful manner to allow the accumulated, radiation-induced charges to bleed off and recover more useful memory than might be available otherwise.

I'm sure we've all at one time or another considered the wide range of backgrounds represented in amateur radio. That cross-section is fairly well reflected in the relatively small number of amateurs who demonstrate an active interest in amateur radio space communications. But when we look at the amateurs who design, build, test and operate our spacecraft, we see an overwhelming proportion of them are involved in the space business professionally. In no other facet of amateur radio is that professionalism needed as it is in amateur radio satellites. Our hobby is indeed fortunate to have such a cadre of individuals willing to devote the time necessary to further the amateur presence in space communications. It takes the launch of a new satellite or a threat to an old one to really bring this point home to us.

Phase 3C, the next high-altitude satellite, was once expected to be launched this fall but the misfortunes suffered by the space launch business this year have delayed it at least until the last half of

(continued inside)

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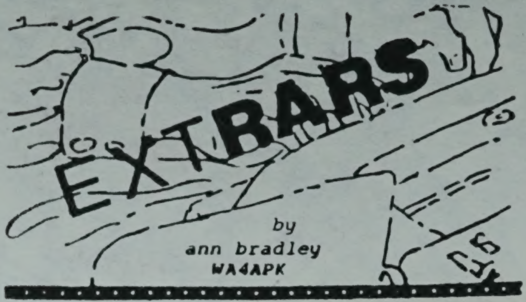

EXTRARS

by
ann bradley
WA4APK

Our good friend and Hamfest Chairman, Al Mullis, K4GOE, has once more been bitten by the "I've Been Moved" bug. Al, Jan and family will be relocated in Houston, Texas. Field Day Chairman, Harry, K1PLR, and XYL Pat will also be leaving the Raleigh area. Both of these members are relatively new to RARs. Their time with us has been short--but both leave RARs the better for their contribution and involvement and its members richer for their friendship. We'll miss you!

****

The Cary Swapfest is notoriously the "Hottest Happening in Town" but this year capped the stack with 100 degree temperatures. The heat, however, did not wilt the hospitality and friendliness of the Cary group nor the fun we have each year chatting with friends around the "Yaller Trailer." Gud Show!

LEADING EDGE (Continued)

1987. As this situation developed, it was planned to spend the extra time on Phase 3C to improve it even further over OSCAR 10. However, the recent problem with OSCAR 10 has devoured most of the available talent. Hopefully, the present difficulties can be overcome in time to expend some effort on improving Phase 3C. One of the foremost tasks will be to beef up the radiation resistance of the electronics in the satellite.

The Japanese amateur radio satellite, JAS-1, originally scheduled for launch on July 31, has been delayed a week to August 7. We have been cautioned that this date might be in jeopardy due to the weather at the launch site. I was hiding from a lightning storm when this news came over the AMSAT net so I'm grateful to Will Harper, K4IWW, for this information.

'ME'? NO, 'YOU'.

wa9new

A personal note I hope you enjoy. I've recently reactivated a modest home computer capability in my 'shack'. My motivation was the frequent visits from two harmonics of one of my harmonics, Sean, 4½, and Casey, 3. While I have some professionally prepared pre-school learning programs, I'm pleased to report that both boys take great delight in playing with a program I got from AC5D called "Kids CW With Speech". You strike any key, the speech synthesizer announces the entry, the character appears in large block letters on the screen, and the Morse Code sounds from the tone generator.

Sean takes this all in stride and enjoys 'making' the letters and numbers on the screen. It's the younger one I have a problem with. I say, "Casey want to make an 'M'?". He nods. I point to the key. He says, "M", depresses the key, looks at the screen to see the letter M appear, hears the speech synthesizer pronounce "M", looks up at me with a smile and says, "He say 'M'". It works every time and we can do it 50 to 100 times in one sitting.

So what's the problem? Well, it's with just one letter. I say, "Casey want to make a 'U'?". He nods, depresses the key I'm pointing to, but he says, "me"! And I can't figure out how to explain the difference between "U" and "me" to a three year old!

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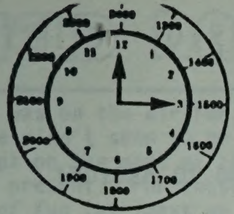

MINUTES OF THE MEETING

The regular monthly meeting of the Raleigh Amateur Radio Society was held July 2, 1986 at the First Presbyterian Church, S. Salisbury St. President Bruce Eggers, WA9NEW, called the meeting to order and welcomed the 32 members and 3 guests.

The first item of business was a summary of the June Board meeting. Among topics discussed were: Tim, N4IQA, volunteered to rehab one of the original W4DW transmitters; The nominations committee needs volunteers; An action item to call Billy, K4BWC, concerning 04/64 repeater coverage; The planning of the 1987 fiscal budget; An announcement by Norm, KN4G, that he will resign as treasurer as soon as a replacement is found.

Bruce Morris, KI4ME, has asked RARS for the use of the club call during emergencies at the State E.O.C. A motion was made and the club supported it. In the event of the County E.O.C. being activated, but not the State, the club call may also be used. The President requested the Secretary to inform AB4W, KI4ME, and K4NYV by letter of this decision.

Walter, KB4LWD, informed the membership of the sucess of the recent special events station at Hatteras Island. He asked that the four British hams the group interacted with be given the status honary members. The club approved and certificates will be issued.

Rollin, NF4P, gave a report on this years field day. Approximately 500 contacts were made (most on cw) by a group that had a great time despite thunderstorms.

A discussion occured concerning the coverage on the 04/64 repeater. Signals are not as strong to the west and south. The membership decided some tests should be done before considering moving the repeater.

The President received a letter from Wake County Information and Referal Service. They wanted to update their info. Contact people from RARS will be Bruce, WA9NEW, and Sue, WB4USX.

Chuck, K4HF, informed members that our old meeting location is now under renovation. He told the group the ally between the new meeting room and Salisbury St. will be blocked off soon. Close parking to the new room will be a problem in the fall once other activities resume. If anyone has any concrete ideas concerning a new meeting location, please let the board know.

John Clapp, AA4MP, told the club House bill 952 (ham license plate fee) has finished in the transportation committee and will move to the finance committee of the Senate on July 3. He encouraged members to attend the open hearing. Contact Peter, KI4AN, at the hearing.

Bruce went over the proposed budget for fiscal year 1987 with the membership. A motion was made and passed to approve the budget.

Vice President Rollin Ransom, NF4P, introduced the program for the evening. Tim, N4IQA, and Tom N4IZE, presented slides from their recent special events location at Cape Hatteras. After the program, a prize drawing was given. There being no further business, the meeting was adjourned.

Sue Meyer Parks
RARS Secretary

FOR SALE "CHEEP CHEEP" - Two black and white monitors - Call Jim, WA4AOO - Home, 851-2437 - Work, 831-3012

'NEW LINE

by Bruce Eggers, WA9NEW
President, RARS

MY FASTEST QSO

A couple of months ago I commented on my longest QSO. It lasted five minutes with a 7 in Nevada. This month I want to report my fastest QSO. It too lasted about five minutes and I must have transmitted close to a dozen words. So why the label as my fastest QSO?

Well, after several days of frustration with the WB4TOP IC-21A, we arranged a QSO with NF4P on packet using a separate transmitter and receiver. It worked! But have you ever tried reading a scrolling screen at 1200 baud? That's a FAST QSO! I'm pleased to report that WB4TOP has joined local packeteers with my old Pace Comm. II, a resurrected 'dumb' terminal from the early days of our Computer Engineering Technology department, and an AEA PKT-1.

I want to thank AB4S for his advice, NF4P for our initial QSO, and a BIG TNX to K4IWW and WA4LPD for their support to the Amateur community through their resources on the K4IWW-1 Packet Bulletin Board System and the WA4LPD-1 Mailbox. It's nice to see the Spirit of Amateur Radio alive and well in the modern age and find 'Elmer' some 20+ years after our first meeting.

-...

BUDGET AND FINANCIAL REPORT

Those members attending the July meeting approved a balanced budget for the coming year. With the reduced dues implementation, we're anticipating a relatively conservative year. But if you're at the August meeting, you'll see our annual financial report. We're fiscally sound. The financial review committee has completed the review of the Treasurer's records. Our cash reserve has again gone up. But RARS still relies upon its members for support in all aspects. This isn't a free hayride you get when somebody draws your name.

-...

KN4G INTENDS TO RESIGN!

After 3½ years of very dedicated service to RARS in the vital role of Treasurer, Norm has found a unique opportunity for career and professional advancement which has already made significant demands on his time and may well require him to be out-of-country for quite some period of time yet this year. We wish him the best and we hope to be able to announce an appointment replacement for the remainder of his term at the August meeting. Pending resolution of this matter, I want you to know that Norm has done an outstanding job of representing YOUR, the RARS member's, dollar at each and every time the Board has taken an action to spend YOUR money. YOU owe Norm a hearty TNX es 73 and I want to convey the same thoughts from the Officers and Board of Directors. 73 es GL
KN4G de W4DW

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RARS NOW A SPECIAL SERVICE CLUB

Just in at presstime. We probably should have done it a long time ago but didn't. After all, we know we do a darn fine job of working for the betterment of Amateur Radio. RARS is modest. And that's not easy when you have so much to be modest about! But now the League is publishing a list of SSCs in the Repeater Directory. There are two other clubs from NC in there, the Mecklenburg ARS and the Alamance ARC. So now, in next year's issue, RARS will be listed. And we have one more way to let folks who are coming to, or passing through, this neck of the woods know we're here.

But I'm here to tell you, this distinction isn't granted to just any club that asks. RARS has worked hard in the past. Recognition as an SSC is an honor we've earned. But it's not a lifelong honor. We have to keep working at it and we'll be looked at each year. I trust we'll continue to deserve this honor and I solicit the support of all members.

...-.-

FIELD DAY

W4DW was on the air for Field Day, 1986 but there didn't seem to be a lot of interest except on the part of those individuals who were present. For those it was a heck of a lot of fun (at least we keep trying to tell ourselves that it was.)

The credit for the fact that we were on the air at all belongs to Harry (K1PLR). He was the one who made the phone calls to get people out there; he was the one who brought out a lot of equipment that was used during the period; and he was the one who engineered the whole thing even though he had a personal problem concerning his job (which I am happy to announce has been rectified). Thank you, Harry, for all your work.

A trapped dipole was thrown up between a couple of trees and was hooked up to a novice station that Chuck (KB4MDZ) and Carla (KB4MDY) manned (pardon the choice of words, you women's libbers). They had a great deal of excitement at their station what with the wind blowing the shelter down and the rain hitting them in the face, but unfortunately they weren't able to make a single contact. (Maybe if they don't upgrade by next year they will try again. But they worked at it.)

Bob Corns (K4MC) arrived before the start of the festivities with a FULL wave loop for 80 meters and proudly announced, "I made it, now you fellows put it up." Man, there weren't enough trees in Wake county to put that thing up. But somehow we managed to get the monster into the air. It may have been held up by trees, dead limbs, and blind faith, but it was up there, and it worked!!

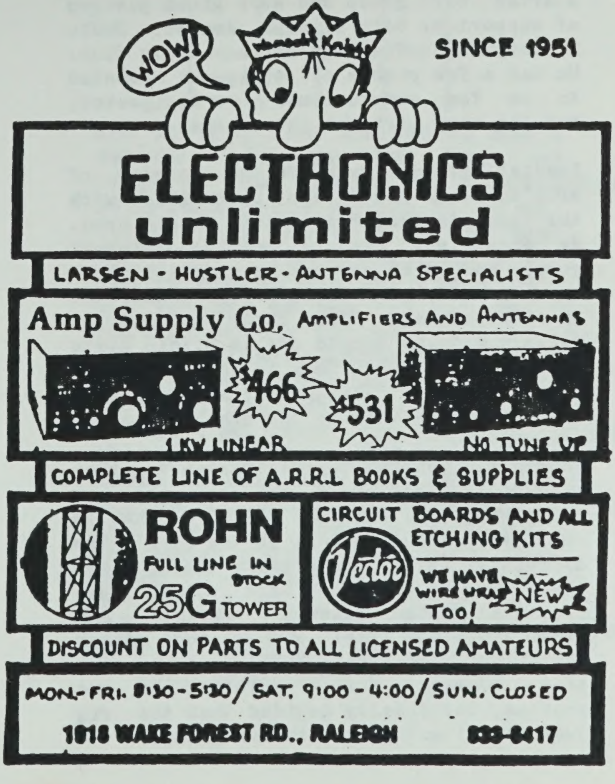
Bob Keys (NA4G) got there with his usual "junque" and proceeded to set up in an area where it remained shady during the whole 24 hours. His antennas consisted of a spool of wire, some nylon fishing line to tie them off and a few fishing weights of the 2 oz. class to get the wire in the air. It, too, may have been cheap, but it worked.

Operating was mostly on the 80-40-20 meter bands. Grover (W4YZX) and Harry (K1PLR) worked about 30-40 stations on phone during the hour that they were there. Bob (NA4G) and John (WB4WWT) worked 20 meter CW, and Bob (K4MC) and Rowlan (KB4QQJ) worked 80 meter CW. I guess that a total of about 600-700 contacts were made but I have no idea of the exact number. That's not really important. The fact remains that we had a heck of a good time.

Three times during the night we were forced to shut down because of thunder showers in the area. Once a bolt of lightening hit a chain link fence that was about 25-30 yards away which caused the fence to sizzle a bit, (That caused a little consternation) and once the wind and rain knocked a shelter down and we got a little wet (soaked to the skin is more like it) getting it back up before the equipment got wet. But we had a good time. Uncomfortable, wet, tired, and dirty, but we knew that we could communicate with someone via Amateur Radio under somewhat less than ideal circumstances.

And let us not forget Sherman (W4TZU) who has made it to about 20 field days. He may not have operated but he was there to help set up and take down the operation. And Diane (WB4INM) who twice braved the rain and the mud to bring food and drink to sustain us through the long night.

There wasn't a great deal of participation this year but those of us who were there had a whale of a good time. I hope that in future years there will be more who will become involved in Field Day. It can be a heck of a lot of fun if you will let it.



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PACKET RACKET
JULY, 1986

Well, I can continue to report that there are more and more new packet stations in the Wake County area of North Carolina. I am beginning to think that maybe this is a mode that is going to stay. Of course, I am kidding. Everyone who has even seen a packet demo knows that this is the way Amateur Radio is going to grow. If you have not seen a good demo, please let someone in the WDCG (Wake Digital Communications Group) know about it and I am sure you will be invited over to spend an evening watching some mighty slick goings on.

Speaking of WDCG, it looks like the long-awaited digipeater should be going on the air shortly. I know we have been saying that for some time now, but there have been some problems to overcome. Let me tell you a little history of the problems we have faced.

About this time last year, there were only a few packeteers in the area. It looked like Wake County, and indeed, North Carolina was getting somewhat behind a few other places in packet activity. We started our group and were given pledges of support by both Raleigh Amateur Radio Society and The Cary Amateur Radio Club. We had a few pieces of equipment donated to us for eventual use on a digipeater, but the hard part was yet to come.

Special care was taken in the forming of WDCG to avoid any form of competition with the good Amateur Radio clubs in the area. We were (and are) a special interest group, and in no way are we a social club. As a matter of fact, we have only two meetings a year. The first one is in January and the second one is within sixty days of the first. This is intentional so as to prevent luring away any potential members or visitors to the other clubs.

We started putting the digipeater together with donated equipment and recently had everything in working order -- that is until we tried to put it on the air. The RF section (a VHF Engineering unit), which has looked great on the bench, just couldn't switch between transmit and receive modes fast enough for packet operation. Jim Hope, K8YTE, spent some time looking for a solution to the problem, but finally decided that the rig just wasn't going to work for packet. We thought about buying a Kenwood 7850 or some such rig to use for that section of the digipeater, but I guess we knew all along that this should be a commercial-quality unit if it was to give satisfactory service in a full-time repeater application.

Recently, Danny Hampton, K4ITL, who has been extremely supportive and helpful during all the planning stages, and the implementation stages of this project, located a General Electric Master Pro II unit with a very good price tag. It was decided quickly that this is how we should go. The Master Pro II series has a reputation for being very reliable and effective in adverse conditions. By now, the frequency determining unit is on order and the Master Pro II should be in hand.

We all know that every packet station is, itself, a digipeater. Why do we need another one like this? Well, first of all most of us don't like to leave our home stations on the air all the time. Another reason is that most of us don't have elaborate antenna systems such as are required for a good digipeater to work.

The main (backbone) frequency being used on two-meter packet radio is 145.010 mHz and this is where the WDCG digipeater will operate. There is a new digipeater operating in Greensboro on that frequency, and we will have access to the rest of North Carolina via K4LKQ-2 (Greensboro) and other repeaters around the state on the same frequency.

As you probably know, even packet radio cannot cope with tremendous crowding that is starting to occur and local areas are starting to choose local frequencies to which they confine their local operation. Wake County area is no different.

As soon as the big digipeater goes on the air we are going to move most of the local operation around here to another frequency. I am voting for a simplex frequency in the middle of 147 mHz -- probably 147.54 mHz. The reasons are threefold:

1. There are a lot of older synthesized rigs floating around which will not operate on 145.010 without modification. I certainly am not against hams making changes to their rigs, but in this case it shouldn't be necessary.

Continued next page....

YLRARS

The July meeting of YLRARS was held the second Wednesday of the month at the K & W Cafeteria at Cameron Village at 6:30pm. There were 12 women in attendance. President Ann Bradley presided.

The major topic of discussion was the fall picnic. Carla and Winnie told us about several locations and food caterers. Discussion centered on the problems with each location or what additional information we will need from the food places. It was decided that additional information will be required before any decision can be reached. We should have more information at the next meeting.

The food and the company were great!! Hope to see a few more new faces at the next meeting.

Cindy Frate
YLRARS Secretary

PACKET RACKET (Continued)

2. When someone of us puts on a gateway station from our local network to the backbone (145.010), it should be far easier to operate on those two frequencies than on two close-together freqs like 145.010 and 145.050 for instance.

3. The last of my reasons will cause some of you to nod your head (if you have been listening to my saga on 2-meters FM). I think we will benefit if we get farther away from the %*&^% CATV leakage which seems to keep cropping up!

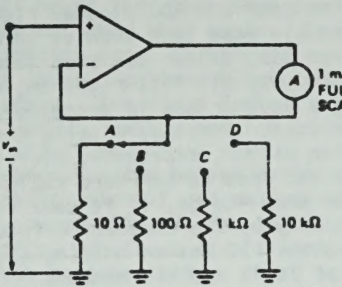
I seem to have rambled a lot in this issue of Packet Racket, but there were several things about which I wanted to say a few words. If you are interested in helping to support the new digipeater for this area, please contact either Will Harper (K4IWW), or Herb Lacey (N4UE) and let them know of your intention. They will be happy to provide you with all the necessary information.

Ed Stephenson, AB4S-O

TTNTT
OP-AMPS, PART 2
wa9new

We took an initial look at a common op-amp last time and ended the article with the tip that, for most applications, two approximations and Ohm's law are all it takes to figure out what an op-amp is doing in a given application. The first is that there will be no voltage between the input pins. The second is that no current flows in or out of the input pins. You do have to provide a path for DC current to ground on the input pins but the current is very, very small.

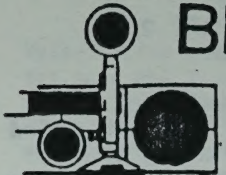
Let's assume you have an old VOM on the bench with a 10K ohm per volt rating. It's low impedance makes it worthless for transistor circuit work. Look at this:



One op-amp, four resistors and a switch. Add your VOM. The 1 mA range of your VOM is now a voltmeter with full scale ranges of 10 mV, 100 mV, 1 V and 10 V. It's just Ohm's law. The voltage on the "+" pin is almost exactly the same as the voltage on the "-" pin and the voltage on the "-" pin is just the current flowing through the meter multiplied by the value of the selected resistor.

And what about the loading effect that just won't allow you to read small voltages on your VOM? Well, the second assumption was that there is no current flowing in or out of the input pins. That would mean there is no loading at all! It's not really quite that good. But in this application the input impedance will be thousands of megaohms!

Next time, active filters.



BERT'S BEAT

WITH
BERT BAILEY, W4FMN

FIELD DAY AT WAKE**

Ole Dad did not honcho FD at Wake Tach for the first time since about 1968 and wa' hoppens? It rains and all but one op takes five. As a matter of fact W4FMN was not even on campus. He was, and still is, taking care of his father's estate up in Virginia. So who was the young hero blasting away at his key while all other, weaker souls shut down in order to avoid becoming a conduit for the blinding lightning that flashed all about? 'Twas young Wilbur of WD4RDJ fame. Yep, when the rains came ole RDJ plodded right on and when his Wake Tech buddies threw a tarp over him, Wilbur was seen thru the canvas to pump his fist right on, not missing a baud or bps in snagging points for ole Wake. Finally, risking their own lives for Wilbur, classmates elevated the tarp on two ends so our hero could at least be seen--to go, if it came to that, --blown away by the thunder or fried by the flashes. It was an amazing sight. Shades of Tesla and his manmade lightning. There were others helping Wake to rack up points but none dah-ditted to the tune of thunder like ole Wilbur. RJ, KB5NBF that is, pieced parts together, and got WB4TOP points for using packet switching under the careful tutelage of Bruce the Honcho, WA9NEW. Jim, wid de WD4BRU call, assisted ops with transmitting hot poop with the group. Joel, old call KA4GEA, knocked out cw on 80 while John, KB4DGJ, helped to keep things going like filling the generator, checking logs, etc. Many other non-ham (YET) students helped out in this '86 stanza of the famous ARRL FD. Eager Beaver Pinkus brought his luxurious van so RJ cud grind out packet in relative splendor. Bab Maya, a vet from Bragg, slapped his E9 stripes back on his sleeves and got things started on Friday. And so it went. 1986 FD has come and gone and it was plain to see that, despite serious misgivings, WB4TOP can indeed survive, even excel, without ole power-in-the-clutch W4FMN. Amazing, great, distressing!

BITS ES BAUDS --..--..---.-

The max rate at which intelligence can be transmitted over a circuit is proportional to the bandwidth of the circuit. The bandwidth is affected by the duration of the shortest signal element. It is inversely proportional to this shortest element. For these reasons, tg speed is expressed numerically as the reciprocal of the duration in seconds of the shortest signal element. The BAUD is this unit of telegraph speed. This speed expresses the number of shortest elements of signal that may occur each second. HF radio uses the ARQ code wherein each element (MARK or SPACE) uses 22 ms of time. Each letter is preceded by a 22 MS space, followed by a 31ms mark. Each letter thu occupies 7 1/2 elements, or 163 ms. Now the average tg word is 6 letters. Since each word takes one second to transmit, 60wpm is the typical speed of the venerable "mill machine." Since each short element lasts 22 ms, the speed in baud, is 1/22 ms or 45 bauds. Confusion occurs when baud is stated to equal bps. This is true only in a binary transmission system where each bit is the same timelength and part of the information being transmitted. With bauds, only those bits carrying information are used to determine the number of bauds. With bps, all bits are counted, whether or not they carry information. With this lucid rendition, the occasional confusion over the identification of bits or bauds should 73 forever. Even the bit freaks should comprehend! QRT

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AND
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NORTH CAROLINA STATE GAMES

Talk about busy weekends, that of June 28th and 29th was it. Not only was it Field Day weekend, the North Carolina State Games Committee asked for almost 400 hours of Amateur assistance. One of the largest requests of its kind in the Triangle Area, this was the forerunner for the National Olympic Festival next year.

Our involvement really started a couple of weeks earlier on June 14th. The State Games had been going on for some time, and the first request for help came with the Bicycle Race that Saturday. We had a good turnout, with N4AJF, KA4ATK, WD4DTI, N4EHM, KB4LWD, N4MAR, KI4ME, AA4MP, KB4NUH, AAB4W, and WB4WWT all assisting. An Excellent turnout for very short notice.

The activities started with the Torch Run on Friday the 27th, with KB4QQJ and WA2FWL doing the honors. Friday evening, WA9NEW and WB4WWT had ringside seats for one of the greatest Opening Ceremonies and fireworks displays seen in this area. If you didn't make it, you missed quite a show. Then came the big weekend... Up to 19 sites, all day Saturday and Sunday. We knew we couldn't cover quite everything on Field Day weekend, so the State Games personnel prioritized them, indicating areas where there were no phones available. We stood by for emergency traffic, and had quite a large number of routine messages going back and forth, especially on Saturday morning.

KI4AN, W4SWA, KB4OHR and WB4INM all did fine jobs as Net Control from the State Games Headquarters in RTP. AB4W and KO4T were racing Reed's yacht that weekend (I heard they took home two fifths, but never found out how they did in the race!), but they helped out when they could. To fill in that gap, KA4YNQ and KJ4DO provided communications with the Yachting event at Kerr Lake. One person who was a big help was KA4ELD. With time becoming very short, Tom (and AEC for Durham County) took over coordination of the Durham and Chapel Hill areas. Tom did a fantastic job getting help with WD0ALH, WD4LOO, KQ4M, KB4OFT, K4GI, KB4QQJ. WD4MGP, W4SSL, and Tom himself all helping out by taking shifts. Without Tom's assistance, we couldn't have done such a good job up there. Another person who made a difference was N4NCK from Butner. Wiley helped quite a lot by ensuring the Shooting At Camp Butner was handled, taking two shifts himself and enlisting the help of N4DAZ and N4NCT. Also working in the Raleigh and Cary areas were N4TN, WA2FWL, WB5ZBQ, WB4YBF, KA4JGF and WA4LGQ who all helped out by taking one or more shifts. While we didn't have as many high priority locations down here, the ones we covered were just as important as those out of town. I would be remiss if I failed to mention Danny, K4ITL. He graciously consented to allow us the use of the 146.88 repeater for the weekend, without which we couldn't have covered the outlying areas. His cooperation, and those who stood by while the net was operating, was much appreciated.

With all the hams involved, I hope I haven't left anybody out. If you or someone you know was missed, please let me know right away - we all appreciate the effort everyone put into making the first State Games a success, and want to make sure all those involved are recognized for their help.

The NC State Games people are extremely pleased with the job we did. They feel we provided a much needed communications function, with our direct links to the 911 system and the State Games Headquarters. The State Games ran much more smoothly with our help, and they are looking forward to working with us next year at the National Olympic Festival.

And, speaking of the National Olympic Festival next year, put it on your calendar right now. It will be the weekend of June 27th and 28th (yes, that's Field Day weekend again), and we'll need even more help. The Festival is a U.S. version of the Olympic Games, and is held in the non-Olympic Games years. If you want to see some of the top U.S. athletes in action, this is the place to be! Plans are to have games all over the Triangle, as well as outlying areas like Greensboro. Plans for this event are already being made - so watch for announcements next spring as to when and where we will need people. This year's State Games was great, but "you ain't seen nuttin yet!"

Jerry, AI0K

6. The Transmitter (and how to use it)

Many OSCAR-10 stations are composed of separate receivers and transmitters. There is however, at least one transceiver, the Yaesu FT726R that is also commercially available for this purpose. This discussion really talks about the transmitter or the transmitter part of an OSCAR-10 Station. OSCAR-10 Mode B uplink is on 435 MHz, centered around 435.100 MHz. The spectrum is the reverse of that on the downlink. The upper parts of this spectrum are used for uplink on the CW, the lower parts are used for uplink on single side band, again with the middle being used for both modes. Again, refer to the Appendices for a detailed description on the types of transmitters available for OSCAR-10.

The transponder on board OSCAR-10 operates on the principal of a "translation frequency." In simple terms, this means the Bird translates or converts any received signal to a different frequency for transmission back to Earth. For OSCAR-10, the translation frequency is 581.0050 MHz. That is, the frequency of the signal beamed back to Earth is equal to 581.0050 minus the frequency of the signal received by the bird from Earth. If you transmit up at 435.105 MHz, for example, then the Bird will re-transmit it at 581.0050 - 435.105 = 145.900 Mhz. In other words, if you transmit up at 435.105 Mhz, you should expect your receiver to receive the downlink on 145.900 MHz. A table in the Appendix shows these relationships so no calculations on your part are necessary.

No more would have to be said about the frequency of the signal received from the Bird were it not for the "Doppler Shift." We have all stood by a railroad track and heard the pitch of the train whistle change as the train approaches and then passes us. That change in pitch was very real even though the frequency of sound coming out of the whistle remained constant. We heard a change in pitch because the source of the sound was moving toward or away from us. We received and heard a slightly higher frequency(or pitch) as the train came toward us and a slightly lower frequency as the train moved away from us. OSCAR-10 moves a whole lot quicker than a locomotive; it is much faster than a speeding bullet. Hence, we encounter a frequency shift, called the doppler shift, as the satellite moves away or toward us in its orbit. This doppler shift then causes us to make a minor "correction" to the frequency at which we should expect to tune our receiver, as explained in the previous paragraph.

Let's say you want to talk on single side band. The first step is to pick out the frequency you wish to downlink on. For this explanation let's assume you find a clear frequency at 145.940 MHz and wish to call CQ there. Next, look on the Mode B frequency guide chart and see that you should set your uplink station to 435.065 MHz. Now get ready to transmit. The correct way to initially locate(receive) yourself is to set your transmitter and receiver to the CW mode, send a few dots up at 435.065, and simultaneously carefully listen for your signal around 145.940. Because of the Doppler Shift it will be necessary to tune your receiver, slightly back and forth around 145.940, until you begin to hear those dots come back down to you. Tune your receiver, not your transmitter, for the very best possible reception. DO NOT SWISH YOUR TRANSMITTER'S VFO BACK AND FORTH WHILE TRYING TO FIND THE DOWNLINK. Once this is done you have established the "translation frequency" that accounts for the Doppler Shift at this particular point in the orbit. Now we will get ready to transmit on OSCAR-10 in SSB. (Be sure to I.D. at this point!)

Since this is in the side band portion of the spectrum, we assume we are going to be calling CQ on SSB. One of the things interesting to note is the OSCAR-10 transponder also "inverts" signals as it retransmits them. If you uplink on LSB on 435.065, you will downlink on USB on 145.940. This example is also the established convention on OSCAR-10; uplink on lower side band, and downlink on upper side band. Make sure when you are trying a single side band QSO that you adhere to this convention. RTTY in most cases is done by AFSK also using this convention, uplink on lower, downlink on upper. CW is rather obvious, up on CW, and down on CW. Follow this convention and you will have no trouble receiving your signal.

This concept, that I hope is becoming obvious to you, is we are participating in a "duplex operation." That is, you can hear yourself on the downlink at the same time you are transmitting on the uplink. Typically, OSCAR-10 operators operate with headphones to prevent their rig's speaker, the downlink signal, from establishing a feedback loop with the uplink signal. With the satellite being 30,000 km away, this feedback loop can be horrendous when it gets going! Please be careful not to let it get started!

If you are uplinking on sideband, you'll find that its very difficult to listen to yourself coming back down, a quarter of a second or so later. This time delay is due to the time it takes the RF to go this significant distance. It will tend to make you slur your speech. Don't get upset, whenever one of the experienced OSCAR-10 operators hears this, he knows he's got a newcomer to the band and they will be very courteous about telling you, "Yes you are on frequency stop here, don't tune anymore," and you'll finally get where it gets to be comfortable and second nature to you to listen to yourself as you talk.

I find that with some rigs, after I've established contact, its easy to turn the downlink audio down while I'm talking and then back up periodically to make sure that the frequency hasn't drifted. I would recommend that technique to you if you have trouble slowing your speech down or slurring it while in QSO.

There is one pitfall in this, and that is we don't want to "walk" all over the band while talking. To prevent this, after establishing a QSO on a given downlink frequency, we only make slight adjustments to our transmitter to accommodate for the Doppler shift. DO NOT TUNE THE RECEIVER! This will prevent you from inadvertently shifting your downlink signal into another QSO.

CONTINUED NEXT MONTH.....

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RARS meets each first Wednesday at 7:30 at First Presbyterian Church, 116 S. Salisbury Street

Calendar

Aug 2 - FCC Amateur Exams-Raleigh

Aug 6 - Regular RARS Meeting
116 S. Salisbury St.
Follow Signs!

Aug 9, 10 - European DX Contest, CW

Aug 10 - RARS Exciter Deadline

Aug 13 - YL RARS Meeting, 6:30 pm
Cameron Village K & W

Aug 20 - RARS Advisory Board Mtng.
7:30 pm NCSU Faculty Club
All Members Welcome!

Aug 23, 24 - All Asian DX Cont., CW

Aug 30, 31 - Shelby NC Hamfest